

**I CLAIM:**

1. A rotor blade assembly for providing vertical lift to an aircraft comprising:

a rotor head;

a plurality of cam surfaces;

a plurality of blades, each blade attached to a cam surface;

whereby movement of a cam surface causes the radial distance between the distal tip of the attached blade and the center of the rotor head to alter.

2. A rotor blade assembly for providing vertical lift to an aircraft comprising:

a rotor head;

an operating cam rotatably mounted relative to the rotor head;

a plurality of cam surfaces on the operating cam;

a plurality of blades, each blade attached to a cam surface;

whereby movement of a cam surface causes the radial distance between the distal tip of the attached blade and the center of the rotor head to alter.

3. The rotor blade assembly of claim 2 wherein the operating cam further comprises:

the operating cam having upper and lower plates;

cam surfaces on the upper plate substantially matching cam surfaces on the lower plate;

each blade spar positioned between the upper and lower plates; and

each blade spar attached to a cam surface on the upper plate and the substantially matching cam surface on the lower plate.

4. A rotor blade assembly for providing vertical lift to an aircraft comprising:

a rotor head;

an operating cam;

a plurality of cam surfaces on the operating cam;  
a plurality of blades, each blade having a blade spar;  
each blade spar attached to a cam surface;  
whereby movement of a cam surface causes the radial distance between the distal tip of the attached blade and the center of the rotor head to alter.

5. A rotor blade assembly for providing vertical lift to an aircraft comprising:

a rotor head;  
an operating cam;  
a plurality of cam surfaces on the operating cam;  
a plurality of blades, each blade having a root and a tip;  
each root attached to a cam surface;  
whereby movement of a cam surface causes the radial distance between the distal tip of the attached blade and the center of the rotor head to alter.

6. A rotor blade assembly for providing vertical lift to an aircraft comprising:

a rotor head;  
a plurality of cam surfaces;  
a plurality of blades, each blade attached to a cam surface;  
whereby movement of a cam surface causes the radial distance between the distal tip of the attached blade and the center of the rotor head to alter;  
at least one pitch controller attached to at least one blade;  
each pitch controller connected to a swash plate; and  
the swash plate moving at least one pitch controller whereby the pitch of its corresponding blade is altered.

7. The rotor blade assembly of claim 6 further comprising:

a plurality of bladelets positioned near the outer periphery of the rotor head;

the bladeletts having a retracted position wherein substantially all portions of the bladeletts are within the outer periphery of the rotor head; and

a bladelett control mechanism for imparting force to the bladeletts, wherein the imparted force moves a portion of one or more bladeletts beyond the periphery of the rotor head, whereby passing air impacts the moved one or more bladeletts exerting a pressure which causes rotational movement of the rotor blade assembly.

8. The rotor blade assembly of claim 7 wherein the bladelett control mechanism further comprises:

an actuator; and

an actuator cable attached to the actuator and one or more bladeletts, wherein energizing the actuator pulls the actuator cable whereby the actuator cable transmits force to the one or more bladeletts.

9. The rotor blade assembly of claim 6 further comprising:

a blade spar on each blade;

each blade spar connected to one cam surface;

a spar guide having an opening, said blade spar passing through the opening in a sliding fit;

said pitch controller having an opening, said blade spar passing through the opening in a sliding fit;

the pitch controller opening having an internal shape substantially matching the external shape of the blade spar; and

a pitch control rod interacting between the pitch controller and the swash plate;

whereby the pitch controller controls the pitch of each blade spar.

10. The rotor blade assembly of claim 9 wherein the internal shape of the pitch controller opening is polygonal.

11. The rotor blade assembly of claim 9 wherein the internal shape of the pitch controller opening is splined.

12. The rotor blade assembly of claim 9 wherein the internal shape of the pitch controller includes curved surfaces.

13. The rotor blade assembly of claim 9 further comprising a swiveling connector connecting the spar guide to the rotor head, wherein the spar guide may swivel relative to the rotor head.

14. A rotor blade assembly for providing vertical lift to an aircraft comprising:

- a rotor head;

- a plurality of cam surfaces;

- a plurality of blades, each blade attached to a cam surface;

whereby movement of a cam surface causes the attached blade to move longitudinally altering its lift characteristics.

15. A rotor blade assembly for providing vertical lift to an aircraft comprising:

- a rotor head;

- at least one cam surface;

- a blade attached to a cam surface;

- a portion of the blade providing lift;

whereby movement of a cam surface causes the attached blade to decrease or increase the length of the portion providing lift.

16. A rotor blade assembly for providing vertical lift to an aircraft comprising:

- a rotor head;

- a rotatable wheel;

- a plurality of blades, each blade attached to the rotatable wheel;

whereby movement of the rotatable wheel causes the radial distance between the distal tip of the attached blade and the center of the rotor head to alter.

17. A rotor blade assembly for providing vertical lift to an aircraft comprising:

a rotor head;

an operating wheel rotatable around a central point, and rotatable relative the rotor head;

a plurality of blades, each blade attached to the operating wheel;

whereby movement of the operating wheel causes the radial distance between the distal tip of the attached blade and the center of the rotor head to alter;

at least one pitch controller attached to at least one blade;

each pitch controller connected to a swash plate; and

the swash plate moving at least one pitch controller whereby the pitch of its corresponding blade is altered.

18. The rotor blade assembly of claim 17 further comprising:

a plurality of bladeletts positioned near the outer periphery of the rotor head;

the bladeletts having a retracted position wherein substantially all portions of the bladeletts are within the outer periphery of the rotor head; and

a bladelett control mechanism for imparting force to the bladeletts, wherein the imparted force moves a portion of one or more bladeletts beyond the periphery of the rotor head, whereby passing air impacts the moved one or more bladeletts exerting a pressure which causes rotational movement of the rotor blade assembly.

19. The rotor blade assembly of claim 17 wherein the operating wheel includes a plurality of lobes, one or more of said lobes adapted to affixing a blade spar thereto.

20. The rotor blade assembly of claim 17 further comprising:

the operating wheel having upper and lower plates;

each blade spar positioned between the upper and lower plates; and

each blade spar attached to both the upper plate and the lower plate.

21. The rotor blade assembly of claim 18 wherein the bladelett control mechanism further comprises:

an actuator; and

an actuator cable attached to the actuator and one or more bladeletts,  
wherein energizing the actuator pulls the actuator cable whereby the actuator cable transmits force to the one or more bladeletts.

22. The rotor blade assembly of claim 17 further comprising:

a blade spar on each blade;

each blade spar connected to the operating wheel;

a spar guide having an opening, said blade spar passing through the opening in a sliding fit;

said pitch controller having an opening, said blade spar passing through the opening in a sliding fit;

the pitch controller opening having an internal shape substantially matching the external shape of the blade spar; and

a pitch control rod interacting between the pitch controller and the swash plate;

whereby the pitch controller controls the pitch of each blade spar.

23. The rotor blade assembly of claim 22 wherein the internal shape of the pitch controller opening is polygonal.

24. The rotor blade assembly of claim 22 wherein the internal shape of the pitch controller opening is splined.

25. The rotor blade assembly of claim 22 wherein the internal shape of the pitch controller includes curved surfaces.

26. A rotor blade assembly for providing vertical lift to an aircraft comprising:

a rotor head;

one or more blades attached to the rotor head;

a piston chamber at the proximal end of said one or more blades, nearest to the center of the rotor head;

a spar guide on each blade;

a piston on each spar guide cooperating with the piston chamber, whereby fluid is forced into one side of the piston chamber driving the associated blade hydraulically in one direction, and whereby fluid is forced into the other side of the piston chamber driving the associated blade in the other direction;

at least one pitch controller attached to at least one blade;

each pitch controller connected to a swash plate; and

the swash plate moving at least one pitch controller whereby the pitch of its corresponding blade is altered.

27. A rotor blade assembly for providing vertical lift to an aircraft comprising:

a rotor head;

one or more blades attached to the rotor head;

means for altering the distance of the distal end of at least one of the blades relative to the center of the rotor head;

a spar guide on each blade;

at least one pitch controller attached to at least one blade;

said pitch controller connected to a swash plate; and

the swash plate moving at least one pitch controller whereby the pitch of its corresponding blade is altered.

28. A rotor blade assembly for providing vertical lift to an aircraft comprising:

a rotor head;

one or more blades attached to the rotor head;

means for altering the distance of the distal end of at least one of the blades relative to the center of the rotor head;

a spar guide on each blade; and

at least one pitch controller attached to at least one blade, whereby the pitch of the corresponding blade is altered.

29. The rotor blade assembly of claim 28 wherein the means for altering the distance is a screw drive.

30. The rotor blade assembly of claim 28 wherein the means for altering is an electric actuator.

31. The rotor blade assembly of claim 28 wherein the means for altering is a magnetic actuator.

32. A rotor blade assembly for providing vertical lift to an aircraft comprising:

a rotor head;

one or more blades attached to the rotor head;

a cable attached at the proximal end of said one or more blades, nearest to the center of the rotor head;

a spar guide on each blade;

a cable retractor to shorten or lengthen the cable to alter the distance from the distal end of the blade relative to the center of the rotor head;

at least one pitch controller attached to at least one blade;

each pitch controller connected to a swash plate; and

the swash plate moving at least one pitch controller whereby the pitch of its corresponding blade is altered.

33. The rotor blade assembly of claim 32 wherein the cable retractor is a reel.